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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# NEW SPONGES FROM THE PUERTO RICAN DEEP

BY

M. W. de LAUBENFELS

Pasadena, California



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### NEW SPONGES FROM THE PUERTO RICAN DEEP

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*Pasadena, California*

In the comprehensive and extensive collection of sponges made by the First Johnson-Smithsonian Deep-Sea Expedition, there are an exceptionally large number of new species—in fact, nearly one-fourth of the total number. Many of these may actually have been collected and described before, but unrecognizably, because in the descriptions made more than 50 years ago very little attention was paid to those microscopic characters that today are considered of primary importance.

In the entire collection, upon which a final report is in progress, there are only a few species belonging to the Calcarea (or Calci-spongiae), and somewhat more of the Hexactinellida (or Hyalospongiae), but apparently no new species of either of these two orders. All the new species are representatives of the Demospongiae. Twenty-seven new species are described. These belong to 17 families, of which 4 are new, and 26 genera, of which 11 are new.

#### HALINIDAE, n. fam.

This family is established to replace Pachastrellidae Hentschel, because *Halina* Bowerbank (1858, p. 288) (not the nomen nudem *Halina* of Grant, 1830, p. 844), which receives *Dercitus* Gray (1867, p. 542) in synonymy, not only is an older genus than *Pachastrella* Schmidt (1868, p. 15) but is also more thoroughly typical of the group here represented.

#### PACHASTRELLA Schmidt

##### PACHASTRELLA DILIFERA, n. sp.

*Holotype*.—U.S.N.M. no. 22331; from station 43, latitude 18°02'00" N., longitude 67°51'15" W. to latitude 18°03'45" N., longitude 67°48'10" W., February 11, 1933, 240 to 300 fathoms.

The specimen is lamellate, triangular, about 7 mm thick, 10 by 15 cm in extent. The color, preserved dry, is very pale; the consistency is

friable. The surface is even, with no detachable ectosome, but at the surface tangent spicules (or clads of spicules) make a tangent network. The numerous conspicuous oscules average about 1 mm in diameter and occur about 7 to the square centimeter. The internal structure is rather confused, with large spicules optically evident. The megascleres comprise calthrops, with rays each about  $50\ \mu$  by  $625\ \mu$ , and oxeas  $60\ \mu$  by  $3,500\ \mu$ . The microscleres consist of streptasters or spirasters with scarcely any spiral to the main shaft whatever, and with a great many long spines, so that the total mass has a diameter of  $10\ \mu$  as compared to a length of only  $15\ \mu$ . The spirasters bear resemblance to caterpillars. There are also metasters, with only 6 to 12 rays each, the outside dimensions of the entire spicule being about  $40\ \mu$  to  $50\ \mu$ . Microrhabds  $3\ \mu$  by  $155\ \mu$  are rather common. Furthermore, occasional reduction-derivatives of the metasters are present, having only 2 or 3 rays.

Interesting comparisons may be drawn between this species and *Pachastrella monilifera* Schmidt (1868, p. 15), a cosmopolitan species that has been recorded from the West Indies. It is conceivable that the present specimen represents an uncommon malformation of *monilifera*, though there are sufficient points of difference to render such a hypothesis improbable. *P. monilifera* does not have the long raphides, but instead centrotylote microrhabds only  $10\ \mu$  to  $20\ \mu$  long. Instead of the large metasters and the peculiar caterpillarlike spirasters, it has rather commonplace small spirasters about  $14\ \mu$  long. *P. cribrum* Lebwahl (1914, p. 78), from Japan, may possibly be related here. Its larger metasters are smaller than those of *dilifera*, the smaller spirasters much shorter and with fewer spines, and the microrhabds twice as thick without being longer.

#### Family CORTICIDAE Vosmaer

##### ROOSA, n. gen.

This genus is proposed for the one new species described below, having as spicules diacts with peculiar medial distortions. The occurrence of a few rare triacts and angular diacts confirms the hypothesis that the spicules are probably reduced calthrops.

*Genotype*.—*Roosa zyggompha*, new species.

##### ROOSA ZYGGOMPHA, n. sp.

*Holotype*.—U.S.N.M. no. 22277; from station 17, latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}10'30''$  W. to longitude  $66^{\circ}12'20''$  W.,

February 3, 1933, 46 to 90 fathoms. In addition to this specimen, I have studied the species freshly collected near the Dry Tortugas, Fla.

The specimen from Puerto Rico is lamellate, 3 by 20 by 35 mm in size. As preserved in alcohol it is blue, and its consistency is much like that of cheese, dense and easily cut. The surface is smooth, lipostomous, without any detachable dermis. The endosome is exceedingly dense, with only small chambers and canals. The spicules are abundant diacts, bent several times about the middle of each spicule. The two straight ends seldom are directly in line with each other, which (as mentioned above) may be accounted for on the basis that they are reduced triacts or tetractinal spicules.

This seems to be a well-marked species, with no very close relatives.

#### Family ANCORINIDAE Gray

Following Hentschel, 1923, this family is here considered to include Theneidae Sollas.

#### ANCORINA Schmidt

#### ANCORINA FENIMOREA n. sp.

*Holotype*.—U.S.N.M. no. 22289.

*Other specimens*.—U.S.N.M. nos. 22288 and 22297.

Three or more specimens of this species were collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

The specimen here selected (because of its internal structure) as the type is an amorphous mass about 9 by 12 by 18 cm. Each of the others is irregularly ramose, with fingerlike projections about 5 to 10 mm in diameter and 5 to 7 cm long. The color internally is uniformly drab. The exterior of the type specimen is only slightly darker than this, but both of the other specimens have relatively much darker ectosomes. The consistency is stiff, woodlike. The surface is even, with optical evidence of contained detritus. The pores and oscules do not show. The endosome is very dense, almost completely packed with spicules, only small canals and chambers occurring. The megascleres are almost exclusively large oxeas, often as much as  $50\ \mu$  in diameter and more than 1 mm long. Smaller ones are also very common. After careful search a few dichotriaenes with shafts about  $45\ \mu$  by  $1,100\ \mu$  long were found in the type, and in each of the other

specimens a few prodiaenes of about the same size. The microscleres, which are abundant, are chiefly asters and raphides. The latter are not spined, but instead are lumpy, about  $60\ \mu$  long, and  $1\ \mu$  to  $3\ \mu$  in diameter. The euasters are in places common and in places rare, and seem not to be spined at all. The ends are hastate, so that it is difficult to term them either oxecote or strongylote.

This species is remarkable among those in the genus *Ancorina* for its lack of anatriaenes. Another having this same characteristic is *A. osculifera* Dendy (1924, p. 300), from the Antarctic, but that has no dichomodifications to its megascleres, and its microrhabds are distinctly strongylote. Another interesting comparison is to *A. cerebrum* Schmidt (1862, p. 46), the type of the genus—a Mediterranean sponge that has many more triaenes than in *fenimorea*, and has distinctly lumpy armed asters of two size ranges.

Named for E. R. Fenimore Johnson, a member of the expedition.

#### HEZEKIA, n. gen.

Judged from the literature, sponges referable to the family Ancorinidae but lacking euasters are relatively rare, although three genera so characterized are found among the specimens obtained by the First Johnson-Smithsonian Deep-Sea Expedition, one of which is here named. This genus is characterized perhaps most decisively by its possession of only spiny microrhabds as microscleres. Its megascleres include oxeas, orthotriaenes, and anatriaenes.

*Genotype and only species.*—*Hezekia demera*, new species.

#### HEZEKIA DEMERA, n. sp.

*Holotype.*—U.S.N.M. no. 22286.

*Other specimens.*—U.S.N.M. nos. 22284, 22285, and 22287.

Four specimens were collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

This sponge is amorphous, the diameter usually 2 to 4 cm, with irregular semidigitate processes about 1 cm in diameter by 1.2 cm high. The color is drab, with a much darker ectosome, the latter frequently brown or reddish brown. The consistency is hard, but somewhat elastic, like cartilage. The surface is even, but occasionally slightly hispid in a few places. Undoubted oscules could not be made out, but the surface is abundantly perforated with minute openings, presumably pores,  $25\ \mu$  to  $65\ \mu$  in diameter. The endosome is dense, fine-grained, with only minute canals. Even the flagellate chambers are exception-

ally small, being only  $15\ \mu$  or  $16\ \mu$  in diameter. The megascleres comprise oxeas and orthotriaenes, the latter with rhabd diameter up to about  $20\ \mu$  and length considerably over 1 mm. The oxeas are of similar proportion; their ratio toward the triaenes varies greatly, sometimes one and sometimes the other being more abundant. Anatriaenes are rare, but when they do occur they are characterized by a peculiar angular bend in each clad, instead of the ordinary symmetrical curve. In the type specimen there are numerous triaenes in which the clads are so reduced that each is merely a rounded lump at that end of the spicule. The microscleres are distinctive and exceedingly abundant, especially in the ectosome. They are minutely spiny or lumpy microrhabds only  $1\ \mu$  thick and seldom more than  $5\ \mu$  long, but a few are as much as  $8\ \mu$ .

Occasionally one sees, not in boiled-out spicule mounts but in sections of the sponge flesh, what at first appear to be asters. They are usually irregular in shape, but once in a while they are nearly circular in outline,  $18\ \mu$  in diameter. They may be rosettelike aggregations of the acanthorhabds comparable to the grouping of anisochelas found in such genera as *Mycale*; again, they may be mere clusters of crystals precipitated by the preservation of the specimen. They are mentioned to indicate the difficulties involved in deciding whether a species contains asters.

The microsclere spiculation of this sponge is so distinctive that it is difficult to cite close comparisons with other species.

#### NEOTHENEA, n. gen.

This genus, like *Hezekia*, is remarkable for lack of euasters. But for this character it may be compared to *Thenea* Gray. The megascleres are dichotriaenes, large and smaller oxeas, metasters, and bent microrhabds that may be reduced asters.

*Genotype*.—*Neothenea enae*, new species.

#### NEOTHENEA ENAE, n. sp.

*Holotype*.—U.S.N.M. no. 22321; from station 37, latitude  $18^{\circ}13'50''$  N., longitude  $67^{\circ}39'20''$  W. to latitude  $18^{\circ}11'55''$  N., longitude  $67^{\circ}42'50''$  W., February 10, 1933, 160 to 200 fathoms.

This specimen is a mass 2 by 6 by 7 cm, apparently broken off from a much larger original flabellate structure, though the original external form must be merely hypothetical. The color is whitish in alcohol, and the consistency is mediocre. The surface is hispid, almost felt-like, shaggy. There is a distinct cortex, a little over  $500\ \mu$  thick. There

are external openings, apparently pores, about  $100\ \mu$  in diameter. The oscules were not found, perhaps having occurred on the portion of the specimen not collected. The internal structure is clearly radiate, the spicules being optically evident. The megascleres are large oxeas,  $70\ \mu$  by  $3,000\ \mu$  in size, and from that up to at least 12 mm long. Some, which are possibly to be regarded as in a separate size category, are only about  $10\ \mu$  by  $210\ \mu$ . There are dichotriaenes with rhabds about  $50\ \mu$  to  $100\ \mu$ , total length to be measured in terms of millimeters. The microscleres comprise metasters about  $30\ \mu$  in greatest extent, with 5 to 15, usually about 8 or 9, rays. There are also once-bent rhabds with oxeote ends, total length about  $40\ \mu$ ; these may be interpreted as asters from which all but two rays have been lost.

An interesting species to compare here is *Pachastrella fusca* Lebewohl (1914, p. 82), a Japanese sponge that should be transferred to the genus here established. This has roughened microrhabds and two sizes of metasters, but otherwise resembles *N. enae* closely. The genus can not only be compared to *Thenaea*, which has euasters in addition to the spiculation of this genus, but also to *Vulcanella* Sollas, which has similar spiculation but has calthrops added.

The species is named for Ena Douglass, who accompanied the expedition.

#### KAPNSOLENIA, n. gen.

This genus resembles *Tethyopsis* Stuart, which, however, lacks the dichotriaenes and has euasters, and *Monosyringa* Brondsted, which also has distinctive euasters.

*Genotype and only species.*—*Kapnesolenia fisheri*, new species.

#### KAPNSOLENIA FISHERI, n. sp.

*Holotype.*—U.S.N.M. no. 22370; from station 99, latitude  $18^{\circ} 39' 30''$  N., longitude  $64^{\circ} 56' 00''$  W. to latitude  $18^{\circ} 40'$  N., longitude  $64^{\circ} 51'$  W., March 3, 1933, 180 to 200 fathoms.

At least two specimens of this sponge were taken at this station, and judged from the fragments, an indeterminate number of additional ones. The principal mass is an almost perfect sphere about 1 cm in diameter, from which extends just one chimneylike hollow tube with paper-thin walls, the total length reaching 8 cm. The color is white and the consistency cartilaginous. The surface is smooth, and the structure of the spherical portion is conspicuously radiate. On the surface it bears pores visible to the naked eye, minute and occurring about 5 to the square millimeter. Abundant dichotriaenes are present



in which the dichotomously branched portion of each clad is longer than the unbranched proximal portion. The chord diameter is about  $800\ \mu$ , the rhabd  $70\ \mu$  by  $2,000\ \mu$ . There are also a few anatriaenes, chord about  $80\ \mu$ , rhabds  $10\ \mu$  by  $1,000\ \mu$ . The microscleres are chiefly abundant spiny microrhabds  $2\ \mu$  by  $9\ \mu$ , mainly in the ectosome. There is a slight tendency for the spines to be nodally arranged. On a few of these microscleres the spines are very thick and coarse, in which cases not so many occur. Such spicules reach external dimensions of  $3\ \mu$  by  $15\ \mu$ .

In addition to *Tethyopsis* and *Monosyringa*, a third closely related genus is *Tribrachion* Weltner, of which the genotype, *T. schmidtii* Weltner (1882, p. 50), is a West Indian species. The external shape is similar, but the dichotriaenes seem lacking and the anatriaenes common. There are euasters in *schmidtii*, but I could not find them in *fisheri*, and the streptasters were only slightly bent spirasters with rather long spines. This must nevertheless be regarded as the species most closely related here.

Named for Prof. Walter K. Fisher, of Stanford University.

#### Family GEODIIDAE Gray

Considered here to include Erylidae Sollas.

#### ERYLUS Gray

##### ERYLUS ALLENI, n. sp.

*Holotype*.—U.S.N.M. no. 22268; from station 16, latitude  $18^{\circ}29'40''$  N., longitude  $66^{\circ}08'30''$  to latitude  $18^{\circ}31' N.$ , longitude  $66^{\circ}10'15''$  W., February 3, 1933, of 38 to 95 fathoms.

This specimen is a cylindrical structure 1.5 cm in diameter, 2.5 cm high, with one conspicuous cloaca or oscule apically located. The color is pale gray. The consistency is astonishingly spongy. The surface is skinlike, even. The pores are abundant, about  $400\ \mu$  apart,  $40\ \mu$  to  $80\ \mu$  in diameter. The internal structure is like "crumb-of-bread", minutely cavernous. The spicules are chiefly oxea,  $12\ \mu$  by  $660\ \mu$ , and triaenes that are almost calthrops. The clads are  $13\ \mu$  by  $200\ \mu$  to  $300\ \mu$ , the rhabds  $13\ \mu$  by  $250\ \mu$  to  $300\ \mu$ . The most conspicuous microscleres are the ectosomal aspidasters, which are  $35\ \mu$  by  $70\ \mu$  in greatest dimensions. Those that seem to be most fully developed have conspicuously granular surfaces and reach a total thickness of about  $5\ \mu$ . As is usual in this genus, they overlap to make a special armor. There are two distinctive size ranges of euasters. The larger ones,

with only about a dozen rays, reach about  $30\ \mu$  in greatest diameter. The smaller, with about twice as many rays, are only about  $7\ \mu$  in greatest diameter. There are also microrhabds  $1\ \mu$  by  $37\ \mu$ , which may possibly be faintly microspined.

The other species of the genus *Erylus* that seems to be the closest to the new species *alleni* is *E. proximus* Dendy (1916, p. 258), from the Indian Ocean. This has the diactinal spicules frequently modified to strongyles or oxeas and has only one type of euasters, which have strongylote ends, instead of the oxeote ends found in *alleni*.

Named for Dr. E. J. Allen, director of the Marine Biological Association of Great Britain, at Plymouth, England.

### Family TETHYIDAE Gray

#### TETHYCORDYLA, n. gen.

This group is here established for a sponge with spicules much like those of the genus *Tethya* except that the microscleres do not have the large conspicuous centrum; there is also a symmetrical stipitate external form.

*Genotype*.—*Tethycordyla thyris*, new species.

#### TETHYCORDYLA THYRIS, n. sp.

*Holotype*.—U.S.N.M. no. 22368.

Three specimens were collected at station 99, latitude  $18^{\circ}39'30''$  N., longitude  $64^{\circ}56'00''$  W. to latitude  $18^{\circ}40'$  N., longitude  $64^{\circ}51'$  W., March 3, 1933, 180 to 200 fathoms.

These specimens consist each of an almost perfectly spherical mass, 6 mm in diameter, on a stalk that is about 1 mm in diameter by 12 to 20 mm long. Around the periphery of the spherical portion, that is, in a position that would be equatorial were the stalk regarded as polar, occurs a series of three or four circular marks. Each circle is 1 mm in greatest diameter; the mark is a groove about  $500\ \mu$  deep and wide; the central disk is level with the general surface of the sponge. Their exact nature is not here interpreted. The only apparently proper openings are abundant small ones, probably pores, each about  $15\ \mu$  in diameter and each about  $50\ \mu$  from its neighbor. The color is pale drab as preserved in alcohol, and the consistency is cartilaginous. The surface is covered with an exceedingly low hispidation and, furthermore, is in a pattern slightly resembling that of small plates, some  $800\ \mu$  in diameter. The megascleres are  $10\ \mu$  to  $35\ \mu$  in diameter, and are usually several millimeters long. They are in many cases fusiform strongyles, but frequently unequally ended, so that the shape approxi-

mates that of a style. The microscleres are exceedingly abundant euasters, usually varying from  $10\ \mu$  to  $50\ \mu$  in total diameter, with all ranges of intermediate sizes between these extremes. In addition, a few are much larger, ranging up to as much as  $150\ \mu$  total diameter. In general the larger ones have smooth oxecote rays, and the smaller ones have more rays, which are strongylote or rounded on the ends, and faintly roughened. Some of the smaller ones have such thick short rays that they almost appear to have centra, or may even resemble knobby spherules.

This is a well-marked new type of sponge, with no very close relatives. The nearest approach is the genus *Tethya*, which has a peculiar surface covered with mushroomlike projections, which may correspond to the equatorial marks of *thyris*. It is by no means so pronouncedly stipitate and has definite spherasters, but its megascleres resemble those of *Tethycordyla*.

Family SUBERITIDAE Schmidt

PSEUDOSUBERITES Topsent

PSEUDOSUBERITES MELANOS, n. sp.

*Holotype*.—U.S.N.M. no. 22360.

The only specimen of this species in the Johnson collection was taken, according to the label, at station 40, but the date, latitude and longitude, and depth, according to the station record, are those of station 80. This was February 26, 1933, latitude  $18^{\circ}19'05''$  N., longitude  $65^{\circ}19'20''$  W. to latitude  $18^{\circ}19'10''$  N., longitude  $65^{\circ}19'40''$  W., 9 to 10 fathoms.

This species is massive, the specimen being rather digitate, 4 by 11 by 35 mm. The color is black, and the consistency is spongy to cartilaginous. The surface is even, lipostomous, and the internal structure is considerably confused. The spiculation consists exclusively of tylostyles about  $10\ \mu$  by  $200\ \mu$ .

I am familiar with this species in the vicinity of Tortugas, north of Cuba, where I have studied the sponge fauna at considerable length. It is remarkable for its black color, which is found or approached in only one other species of the genus—*Suberites montiniger* Carter (1880, p. 256). This is an Arctic species and rather briefly described, but its color seems to have been slightly different, its spiculation of somewhat different sizes, and it was provided, even though a small specimen, with conspicuous oscules. Burton (1929, p. 446) correctly referred it to the genus *Pseudosuberites* because of its possession of dermal tangent spicules, which are also found in *P. melanos*.

**STYLOSPIRA, n. gen.**

This genus is proposed for a sponge having no spicules other than peculiar spirally twisted styles.

*Genotype*.—*Stylospira mona*, new species.

**STYLOSPIRA MONA, n. sp.**

*Holotype*.—U.S.N.M. no. 22324; from station 38, latitude 18° 11' 55" N., longitude 67° 42' 50" W. to latitude 18° 10' N., longitude 67° 46' W., February 10, 1933, 240 to 260 fathoms.

This specimen is doughnut-shaped, 1.5 by 3 by 3.5 cm, outside measurements. The central hollow perhaps represents a place where the sponge grew around some foreign material, which has since been removed, and seems to have no physiological significance in the sponge itself. The color is nearly white as preserved in alcohol, and the consistency is difficult to describe inasmuch as it shows some hard stony characteristics, but in other ways is compressible, almost spongy. The surface is even and minutely punctiform. The apertures, which are exceedingly minute, presumably represent pores, now closed; the oscules could not be located. The interior is minutely cavernous, or "crumb-of-bread", in structure. The spiculation as to megascleres consists of large monaxons 20  $\mu$  by 500  $\mu$ , each bent rather sharply near the blunt end. In fact, they are usually bent two to four times, and most of them have at that end a swelling or tylote modification, which is not always directly at the end, so that the spicules may be regarded as styles that are partially tylote. The bends are frequently so placed that the blunt end of the spicule is actually spiral in shape. This is an unusual spicule type but is found, together with rhabdostyles, in the sponge described as *Microciona pusilla* by Carter (1876, p. 239). This should be transferred to the genus *Rhabdosigma*, whose genotype, *Sigmaxinella mammillata* Whitelegge (1907, p. 512), an Australian species, also has very similar megascleres. Carter's specimen was from the West Indies, but *R. mona* appears to have none of the peculiar sigmas characteristic of *Rhabdosigma*; instead it possesses raphides, about 2  $\mu$  by 150  $\mu$  in size, as microscleres. With the possible exception of *Rhabdosigma pusilla*, mentioned above, *Stylospira mona* seems to have no close relatives.

**RIDLEIA Dendy****RIDLEIA DENDIIA, n. sp.**

*Holotype*.—U.S.N.M. no. 22323; from station 38, latitude 18° 11' 55" N., longitude 67° 42' 50" W. to latitude 18° 10' N., longitude 67° 46' W., February 10, 1933, 240 to 260 fathoms.

This specimen is partly a hollow digitate structure 1 by 1 by 6.5 cm. with walls 2 mm thick, or slightly thicker. To this are added some vague fragments, apparently indicating that this is a process broken off from a more or less massive main portion. The color as preserved in alcohol is whitish, with a decidedly yellowish tinge. The consistency is stony but brittle. The surface is almost level, but does possess numerous low tubercles. It is lipostomous, no oscules or pores being evident, unless the central hollow be regarded as a cloaca or oscule. The internal structure is densely crowded, in a confused manner, with spicules not symmetrically placed; they are tylostyles with fusiform shafts. Their total dimensions are about  $20\ \mu$  by  $500\ \mu$ . The dermal spicules are not conspicuously smaller than those in the endosome.

The only other species at present recorded from the genus *Ridleia* is *oviformis* Dendy (1888, p. 515). It was a flask-shaped sponge with a hollow prolongation similar to the one obtained by this expedition, but its spicules were not only much smaller,  $2\ \mu$  by  $200\ \mu$  to  $14\ \mu$  by  $900\ \mu$ , but in addition the dermal ones were definitely smaller than the rather scanty endosomal ones. This is clearly the species closest to the new one here described.

Named for the late Prof. Arthur Dendy, of London.

#### Family AXINELLIDAE Ridley and Dendy

##### ANACANTHAEA Row

##### ANACANTHAEA REA, n. sp.

*Holotype*.—U.S.N.M. no. 22301.

There were two specimens each collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

Each specimen is amorphous, the irregular mass being in one case 3 by 4 by 5 cm and in the other 5 by 7 by 8 cm. The color is pinkish gray, the consistency cartilaginous, difficult to cut. There is evidence of a cortex, and the surface is pronouncedly tuberculate, with tubercles about 2 mm across and 1 mm high. As seen from above, these tubercles are arranged over the surface so as to appear as hexagonal areas. Perhaps the pores are in the cracks between these tubercles. They, and the oscules, could not be made out with certainty. The internal structure is dense, heavy, and with conspicuously granular amoebocytes. There is a peripheral region in which the spicules are almost at right angles to the confused core. The spicules themselves consist of diactines,  $2\ \mu$  to  $7\ \mu$  in diameter and about  $300\ \mu$

long. These superficially appear as oxeas, but in reality their exact nature cannot be made out easily. At each end of the spicule there is a series of stages like steps, each successively suddenly smaller than the proximal one, until the distal unit is very minute.

This peculiar spiculation is found as an unusual modification in many sponges, but its extreme development is found in only a few genera, of which a typical one is *Anacanthaea* Row, whose other species (*A. nivea* Row, 1911, p. 329) was from the Red Sea and had its surface marked by grooves into polygonal areas, indicating close relationship to the West Indian sponge *A. rea*. Its color, however, was white, instead of dark pinkish gray, and its spicules about half again as large.

#### Family HALICHONDRIIDAE Gray

##### DACTYLELLA Thiele

##### DACTYLELLA RHAPHOXEA, n. sp.

*Holotype*.—U.S.N.M. no. 22303; from station 26, latitude 18°30' 20" N., longitude 66°22'05" W. to latitude 18°30'30" N., longitude 66°23'05" W., February 7, 1933, 33 to 40 fathoms.

This specimen has a small central mass, about 1.5 cm in diameter, from which arise three digitate projections, 5 to 7 mm in diameter and reaching a total length, in one case at least, of 6 cm. The color is dark pinkish gray. The consistency is cartilaginous, and the surface is even. The dermal structures are very fleshy, pierced by apertures about 200  $\mu$  in diameter, covered with sieves in which the openings are about 30  $\mu$  only. It is not clear whether these are oscules or pores, or if perhaps some may not be inhalant, while others are exhalant. The internal structure is dense, fine-grained. There is an axial region of parallel spicules making up the bulk of the sponge, around which a vague external portion comprises spicules more or less in confusion, not in any definite layer; nor is there any sharp dividing point between the endosome and ectosome. The spicules are altogether oxeas of tremendous size variation, frequently reaching 15  $\mu$  by 5,000  $\mu$ , but also very abundant ones are only 1  $\mu$  by 50  $\mu$ ; this is especially true of those in the dermis. Possibly the larger ones are megascleres and the smaller ones microscleres, but the considerable number of intermediate forms renders this doubtful.

The only other species at present referred to the genus *Dactylella* is *hilgendorfi* Thiele (1898, p. 56), a Japanese sponge that agrees rather closely with the West Indian form *D. rhapsodia*, except that

the spicules are much larger, reaching a size of  $25 \mu$  by  $1,600 \mu$ ; and I do not find any reference in the description of *hilgendorfi* to the dermal sieves that are so characteristic of *rhaphoxea*.

#### HYMENIACIDONIDAE, n. fam.

This group is separated from the Axinellidae by the possession of a smooth or fleshy ectosome in contrast to the hispid one of erect spicules characteristic of proper Axinellidae. It is related to that family, like it having a plumose to confused interior, few microscleres, and a ready transition of megascleres between the monactinal and diactinal forms.

#### VILES, n. gen.

This genus is erected for sponges much like *Acanthella* Schmidt but having oxeas for main spicules instead of styles. The flexuous oxeas found in *Viles* as auxiliary spicules much resemble the illustrations to which Carter (1876, p. 459) applies the generic designation of *Ophiraphidites*, but since otherwise this presumed genus of Carter's is utterly unrecognizable, one cannot say whether it is congeneric with *Viles*.

*Genotype*.—*Viles ophiraphidites*, new species.

#### VILES OPHIRAPHIDITES, n. sp.

*Holotype*.—U.S.N.M. no. 22334; from station 45, latitude  $18^{\circ}13'10''$  N., longitude  $67^{\circ}25'30''$  W. to latitude  $18^{\circ}14'30''$  N., longitude  $67^{\circ}25'30''$  W., February 13, 1933, 20 to 40 fathoms.

The specimen is a subspherical mass 2 by 3 by 4 cm, about half covered by a calcareous layer that seems to be algal. The sponge may have grown into the mass of algae, rather than having been overgrown by it. The color is dark gray, with a slightly pinkish shade that may not be proper to the species. The consistency is slightly spongy but in general mediocre. The surface is uneven but not pronouncedly hispid, merely irregularly covered with low lumps. The pores are not evident, but there is an oscule about 2 mm in diameter. The internal structure is confused, with evident spicules, presenting a type of arrangement difficult to describe except by comparison to some such tetraxonid genus as *Pachastrella*. The larger spicules are oxeas, nearly straight, reaching a maximum size of  $20 \mu$  by  $1,000 \mu$ , but oftener about  $12 \mu$  by  $600 \mu$ . Among them, and binding them together, are sinuous, much-curved diactines, which are essentially oxeas but almost attain the shape of ends that would cause them to be termed strongyles.

The diameter of each is about  $5 \mu$ , and the length, if straightened out, would be nearly  $300 \mu$ .

As noted above, there is some slight indication of relationship in general to the genus *Acanthella*, but no one species of sponge appears to be closely related to *Viles ophiraphidites*.

#### DENSA, n. gen.

This genus is established for a sponge that shows very close relationship to the genus *Hymeniacion* Bowerbank in every respect, including the arrangement of the spicules and the endosome and ectosome, except that as spicules there are oxeas only, and not styles as characteristic of *Hymeniacion*. Further comparison might be made to the genus *Collocalypta* Dendy, which reads on paper as if it might be closely related, but it is sharply separated by having a notable quantity of spongin and even more colloidal jelly conspicuously present. The genus *Hoplochalina* Lendenfeld resembles *Densa* in some respects, but is notably fibro-reticulate in architecture. *Halichondria* Fleming itself deserves comparison here, but it is a genus not nearly so dense and possesses a conspicuous detachable dermis. As noted above, the evidence would seem to be of closest relationship with *Hymeniacion*.

*Genotype*.—*Densa araminta*, new species.

#### DENSA ARAMINTA, n. sp.

*Holotype*.—U.S.N.M. no. 22298; from station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

The specimen is an irregularly lobate mass, 3 by 5 by 8 cm. The color is greenish black as to exterior, over a pale drab interior. The consistency is somewhat compressible, easily torn, and might be described as mediocre. The surface is microtuberculate, optically even, being well rounded over the protrusions. The dermis is not easily detachable, being a confused mass of spicules blending into the confused breadlike cavernous interior. The oscules and pores could not be made out. The spiculation consists exclusively of oxeas, of which typical sizes may be listed as follows:  $4 \mu$  by  $100 \mu$ ,  $5 \mu$  by  $140 \mu$ ,  $3 \mu$  by  $90 \mu$ .

Sponges having such simple spiculation may appear in print as though closely related, but actually they may be quite distinct genetically. There are many species in several genera which on paper bear some resemblance to *D. araminta*, but in view of the information at present available close relationships cannot be established.



**OXEOSTILON Ferrer-Hernández****OXEOSTILON BURTONI, n. sp.**

*Holotype*.—U.S.N.M. no. 22347; from station 52, latitude  $19^{\circ}10'25''$  N., longitude  $69^{\circ}20'55''$  W. to latitude  $19^{\circ}10'05''$  N., longitude  $69^{\circ}21'25''$  W., February 16, 1933, 14 to 22 fathoms.

This specimen is a mass about 3 by 6 cm, having an irregular surface. It is profusely covered with grooves about 3 mm deep and of similar width, separated from each other by protrusions and ridges of approximately the same dimensions. The color is pale drab, and the consistency is notably spongy. The surface is minutely hispidated, not by protruding spicules alone, but by little fibers scarcely  $50\ \mu$  in diameter and less than  $500\ \mu$  high. In some of the grooves there seems to be a sort of dermis, roofing over subdermal cavities. If there were pores in this dermis, they are closed, because at present the surface does not reveal any evident openings. Internally there is a confused structure, with a much denser axial region making up about one-third of the total diameter of the sponge, but not having sharply defined boundaries. The spicules show great variation both in size and shape, some being clearly oxeas, others being definitely styles. Representative spicule measurements, selected from many to give an indication of the variation, are as follows:  $22\ \mu$  by  $330\ \mu$ ,  $24\ \mu$  by  $400\ \mu$ ,  $6\ \mu$  by  $520\ \mu$ . In general the styles and oxeas are of about the same size, although the styles show perhaps greater variation than the diactines.

The one other species at present referred to *Oxeostilon* is *annandalei* Ferrer-Hernández (1922, p. 255). Unlike the West Indian form, this one from Spain has a smooth surface without the fibrous hispidation, and some of the spicules are faintly polytylote, or malformed in other ways. No other species can be cited at present as being closely related here.

Named for Maurice Burton, of the British Museum.

**OPHLITASPONGIDAE, n. fam.**

This family is established for genera from the family Microcionidae de Laubenfels that differ from typical species of that group in having the echinating spicules not at all spined. While at first glimpse this appears as a fine distinction, it will be noted that for just this slight variation the family approaches closely to Axinellidae, which is often regarded as far removed from Microcionidae. In order to distinguish this new family from Axinellidae, one must point out that many (but by no means all) of the genera in Ophlitaspongidae have the tylote modification of their exclusively monaxon megascleres, and that they

often have microscleres of more or less elaborate form. The general architecture is plumose because of the smooth spicules echinating the tracts or fibers.

**AXOCIELLA** Hallmann

**AXOCIELLA CALLA**, n. sp.

*Holotype*.—U.S.N.M. no 22333; from station 45, latitude 18° 13' 10" N., longitude 67° 25' 30" W. to latitude 18° 14' 30" N., longitude 67° 25' 30" W., February 13, 1933, 20 to 40 fathoms.

This specimen looks like a cylindrical sponge, but actually it is encrusted on a gorgonian stem. It reaches a diameter of 15 mm; one portion is 11 cm long and another is 16 cm long, on the same basal gorgonian. As preserved in alcohol the color is a medium gray (the label bears a notation that there is a color sketch), and the consistency is spongy. The external surface is porous, or even cavernous. It is possible that the sponge had died before collection and was partially macerated, but the histological condition is not such as to make this certain. Because of this porous or almost honeycomb structure, the oscules and pores are atypical. The gross chambers continue on down into the endosome, being frequently about 1 mm in diameter. Between them there are ascending tracts containing spongin and ranging from 60  $\mu$  to 140  $\mu$  in diameter. In these the spicules are arranged in such an axinellid or plumose fashion that nearly all could be said to be echinating rather than coring. These megascleres are monaxons that range from plain styles to subtylostyles and have average dimensions of about 10  $\mu$  by 150  $\mu$ , but the range in size is considerable. The microscleres include abundant palmate isochelas about 20  $\mu$  long and toxas only once bent, the distal extremities being practically straight; these range from 40  $\mu$  to 130  $\mu$  in total length.

It is difficult to discuss the relationships of this species because, although no sponges at present referred to the genus *Axociella* are close to it, the genus has been generally overlooked, and it is quite likely that a careful search (especially a study of original specimens) will disclose that many species now referred to other genera should be transferred to *Axociella*. Some of these may prove to be closely related to the West Indian form *A. calla*. The cavernous structure, however, is seldom associated with species having isochelas as compared to anisochelas, for which latter see the genus *Mycale* Gray. Another genus to be noted in this regard is *Thalysias* Duchassaing de Fombressin and Michelotti, of which the genotype should be fixed as *T. virgultosa* D. & M. (1864, p. 86) (they regard this as identical with *Spongia virgultosa* Lamarck, 1813, p. 446, but this is doubtful). *Thalysias* differs from *Axociella* in having spiny echinating spicules.

## Family MYXILLIDAE Topsent

## ANOMOLISSA, n. gen.

This genus is erected for a specimen that, as in the genus *Lissodendoryx* Topsent, has special dermal diacts over endosomal monacts, and microscleres that in general are arcuate chelas. These latter are, however, curiously malformed, and the special dermal spicules are erect oxeas instead of tornotes.

*Genotype and only species.*—*Anomolissa amaza*, new species.

## ANOMOLISSA AMAZA, n. sp.

*Holotype.*—U.S.N.M. no. 22348.

Four specimens were collected at station 52, latitude  $19^{\circ}10'25''$  N., longitude  $69^{\circ}20'55''$  W. to latitude  $19^{\circ}10'05''$  N., longitude  $69^{\circ}21'25''$  W., February 16, 1933, 14 to 22 fathoms.

These specimens are all smoothly rounded amorphous masses, two of them having long, thin, twisted projections 3 to 4 mm thick and about 4.5 cm long. The main masses of all are about 1 to 2 cm in diameter. The color is very pale, and the consistency cartilaginous. The surface is hispid with projecting spicules, some more than 1,000  $\mu$  long. The pores and oscules cannot be made out. The internal structure is in general radiate, densely packed with spicules. As noted above, the ectosomal specialization is a dense palisade of erect spicules perpendicular to the main mass of the sponge. These are oxeas, often about 4  $\mu$  by 130  $\mu$ ; some are larger, however, and there are all intermediates up to the much larger spicules of the radiate endosome. Two sorts of endosomal megascleres are present; there are first the large oxeas mentioned above, which attain a maximum size of at least 50  $\mu$  by 1,500  $\mu$ . The typical endosomal spicules are styles, 11  $\mu$  by 390  $\mu$ . The abundant microscleres are technically arcuate isochelas, but they are twisted, slightly unequally ended, and the prongs are very sharp, suggestive of the unguiferate type, rather than smoothly rounded.

This species is to be compared carefully with the one described originally as *Desmacidon titubans* by Schmidt (1870, p. 55), for which Topsent (1928, p. 206) proposed the subgenus *Anomomycale*. It seems to me advisable to regard this as a valid genus, instead of merely a subgenus, and I therefore propose that such a change be now established. *Anomomycale* is not recorded in the literature as having dermal diacts, and it does have sigmas and a moderately reticulate arrangement of the megascleres. Its chelas were curiously malformed in a way that may indicate genuine close relationship to *Anomolissa amaza*, but this may be a coincidence.

## Family LATRUNCULIIDAE Topsent

## ALCYOSPONGIA, n. gen.

This genus is proposed for a specimen bearing some apparent relationship to the genus *Podospongia* du Bocage which is usually placed in the family Latrunculiidae. The West Indian specimen, however, has straight streptasters not conspicuously symmetrical as are those of *Podospongia*, and a slight but perhaps significant difference in architecture in that the central point to the radiate structure of the mass of the sponge is basal, that is, near the pedestal, rather than centrally located within the spherical main portion. Consequently the family allocation must be regarded as dubious. The diagnosis of *Alcyospongia* may be given as sponges with stalk and root, radiate structure in the main mass, spiculation of oxeas to which straight streptasters are added, the latter frequently showing nodal arrangement of spines.

*Geotype and only species.*—*Alcyospongia india*, new species.

## ALCYOSPONGIA INDIA, n. sp.

*Holotype.*—U.S.N.M. no. 22365.

The one specimen and some doubtful fragments were collected at station 81, latitude  $18^{\circ}29'45''$  N., longitude  $65^{\circ}25'50''$  W. to latitude  $18^{\circ}35'30''$  N., longitude  $65^{\circ}23'54''$  W., February 26, 1933, 200 to 400 fathoms.

This sponge has its main body not quite spherical, about 10 mm in diameter. The stalk is 1 mm in diameter and attains a total length of 20 mm. At the lower end it divides first once dichotomously, and then each branch divides into several fine rootlike structures. The color as preserved in alcohol is very pale, nearly white. The consistency is softly spongy. The surface is even, and there is no easily detachable ectosome. The pores are abundant, easily seen with the unaided eye, about 1 mm apart; no especially large ones could be made out, and the exhalant apertures are therefore unknown. The architecture is in general radiate, and is described under the foregoing generic diagnosis. The fibers, which spread out into the head of the sponge from the stalk, are each about  $140\ \mu$  in diameter. The principal spicules are oxeas, about  $10\ \mu$  by  $500\ \mu$  in dimensions, but so frequently broken that the maximum sizes cannot be given with certainty. The microscleres show considerable variation. Some of the simpler ones are scarcely more than acanthoxea, or spiny rhabds, about  $40\ \mu$  to  $50\ \mu$  long, with spines about  $3\ \mu$  to  $5\ \mu$  high. There is a pronounced tendency, however, for the spines to be grouped in two nodes along

the length of the rhabds, and in some individual spicules the symmetry is so great as to resemble the peculiar microscleres of the genus *Didiscus* Dendy.

As indicated above, systematic allocation of this sponge is rather difficult. The general external appearance is much like that of *Podospongia*, but the internal architecture differs in a way that may or may not be highly significant. Some of the microscleres bear a strong resemblance to those found in *Podospongia*, but against this is the possibility that the resemblance may be merely a coincidence. *Podospongia* is from deep water in the eastern Atlantic but at about the same latitude as *Alcyospongia india*, which is also from rather deep water.

#### ADOCIIDAE, n. fam.

This family name is proposed for the group hitherto called Gelliidae Ridley and Dendy, the new name being necessary because Burton (1934, p. 530) demonstrates that the type specimen of the type species of the genus *Gellius* is an exceedingly minute, possibly pathological, or very juvenile sponge, so that we must regard *Gellius* Gray as an unrecognizable genus.

#### STRONGYLOPHORA Dendy

##### STRONGYLOPHORA RAMPA, n. sp.

*Holotype*.—U.S.N.M. no 22386.

*Other specimens*.—U.S.N.M. nos. 22387, 22273, 22254, and 22305.

The type specimen is from station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., March 8, 1933, of 80 to 120 fathoms. Another specimen was collected at the same station. One was taken at station 26, February 7, 1933, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., 33 to 40 fathoms. Two were collected at station 17, February 3, 1933, latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}10'30''$  W. to latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}12'20''$  W., of 46 to 90 fathoms. One was taken at station 16, on the same day, latitude  $18^{\circ}29'40''$  N., longitude  $66^{\circ}08'30''$  W. to latitude  $18^{\circ}31'00''$  N., longitude  $66^{\circ}10'15''$  W., 38 to 95 fathoms.

The type specimen and no. 22305 are cylinders 7 cm in diameter and about equal in height. No. 22273 is also cylindrical, but the other three are not so symmetrical and are slightly smaller than the type. The color as preserved in alcohol is gray, and the consistency is slightly spongy but easily broken or torn. The pores are abundant, minute,

in exceptional cases as much as  $170\ \mu$  in diameter, and number about 10 to the square millimeter. The oscules are not evident, and we may assume that the exhalant openings resemble the inhalant. The ectosome contains numerous tangent spicules and may be removed with moderate ease, so that there may be said to be a special dermal skeleton. The genotype and no. 22305 possess in the center of the upper surface a peculiar depression, which in general tapers to the bottom like an inverted cone, and on the walls of this depression at intervals between the top and the bottom occur sharp ridges running quite around it. Were this a single ridge that descended to the bottom in a spiral, one would suspect that the sponge had grown around a snail shell, but the indications are positively to the contrary. There are relatively large canals that ascend through the sponge parallel to the curved sides, perpendicular to the flat base. These are about 2 or 3 mm in diameter. They do not communicate with the exterior by any conspicuous opening through the dermis at all but are roofed over by the above-mentioned special tangent dermal skeleton. The internal structure in general is cavernous. Some foreign material is present, and in a few cases there are vague tracts about  $150\ \mu$  in diameter crowded with spicules and containing some spongin. The principal spicules are strongyles of astonishingly regular size and shape, the thickness varying only between about  $12\ \mu$  and  $13\ \mu$ , and the length only between about  $330\ \mu$  and  $380\ \mu$ . In addition to these there are microrhabds or oxeas  $2\ \mu$  to  $3\ \mu$  in diameter and  $100\ \mu$  to  $300\ \mu$  long. In the type specimen I find what I take to be embryos; these are about  $650\ \mu$  in diameter, subspherical, and nearly black.

*Strongylophora* in general is an East Indian or Indian Ocean genus, and none of the other hitherto described species has microscleres nearly so long as the microxeas of *rampa*, and furthermore all the other species have at least some of the megascleres much larger than any of those in *rampa*. That two specimens out of four have the same sort of peculiar concavity is significant. This species is so common that one would strongly suspect its occurrence in some earlier collections, but since there seems no way of telling which of many earlier names was given to it, we are forced to describe it as a new species.

#### Family COELOSPHAERIDAE Hentschel

##### COELOSPHAERELLA, n. gen.

This designation is proposed for a small group of species resembling *Coelosphaera* but having palmate isochelas instead of arcuate, and

toxas instead of sigmas. To this genus should be transferred *Coelospaera toxifera* Wilson (1925, p. 435) and *Histoderma vesiculata* Dendy (1905, p. 166).

*Genotype*.—*Coclosphaerella johnsoni*, new species.

#### COELOSPHAERELLA JOHNSONI, n. sp.

*Holotype*.—U.S.N.M. no. 22364; from station 81, latitude  $18^{\circ}29'45''$  N., longitude  $65^{\circ}25'50''$  W. to latitude  $18^{\circ}35'30''$  N., longitude  $65^{\circ}23'54''$  W., February 26, 1933, 200 to 400 fathoms.

This specimen is an almost perfect sphere, 14 mm in diameter. Here and there from its surface protrude processes about 2 mm in diameter and 3 mm high. About half of these are open at the end, as if they were oscules, and about half are closed, as if they were fistules. The color is pale, almost white, and the consistency mediocre. The ectosome is readily detachable, because it overlies extensive subdermal cavities. Many of the spicules in it are tangentially arranged. Pores could not be made out, unless they are represented by the fistular projections, and, as mentioned above, other surface structures are perhaps to be interpreted as oscules. The endosomal structure is rather cavernous, and contains relatively few spicules. The chief rigidity of the sponge comes from the ectosome. The principal spicules are strongyles,  $9\ \mu$  by  $420\ \mu$ , to which are added as microscleres palmate isochelas  $15\ \mu$  long and toxas of typical shape  $70\ \mu$  to  $140\ \mu$  long.

The closest relative of this species seems to be *C. toxifera*, from the Philippines, but that species had much larger megascleres and chelas; the former about  $16\ \mu$  by  $360\ \mu$  and the latter  $20\ \mu$ . In many other ways, however, the relationship is clearly very close.

Named for Eldridge R. Johnson, sponsor of the expedition.

#### INFLATELLA Schmidt

#### INFLATELLA BARTSCHI, n. sp.

*Holotype*.—U.S.N.M. no. 22391; from station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., March 8, 1933, 80 to 120 fathoms.

There are two specimens of this sponge, each consisting of a basal mass 4 or 5 cm long, from which arise about a dozen fistules, 2 mm in diameter, with exceedingly thin walls, only about  $80\ \mu$  thick. The color is green as preserved in alcohol, and the texture is fragile. The surface is even, glossy, smooth; no pores or oscules other than the above mentioned fistules could be made out. The internal structure is amorphous. The spicules are strongyles only  $5\ \mu$  by  $250\ \mu$ .

Quite a few species are referred to the genus *Inflatella*, practically all representing Arctic or Antarctic specimens and all having spicules more than twice as large in each dimension as those of *bartschi*. Very probably all these other described species are synonymous and should have as their name *Inflatella pellicula*, the genotype, which was first described by Schmidt (1875, p. 117). The Antarctic specimens may perhaps be separated from the Arctic ones on the strength of more elaborate architecture, in which case they should be referred to as *Inflatella tubulosa*, which was first described as *Joyeuxia tubulosa* by Topsent (1904, p. 206).

Named for Dr. Paul Bartsch, director of the expedition.

#### Family DESMACIDONIDAE Gray

##### GELLIODES Ridley

##### GELLIODES LEUCOSOLENIA, n. sp.

*Holotype*.—U.S.N.M. no. 22378; from station 102, latitude 18° 50' 30" N., longitude 65° 43' 00" W. to latitude 18° 51' N., longitude 64° 33' W., March 4, 1933, 90 to 500 fathoms.

This is a massive sponge 1 by 1 by 2 cm and nearly white. The consistency is soft. The pores and oscules could not be made out. The surface is superficially smooth, although made up of erect spicules, packed together perpendicularly to the main mass. The outstanding characteristic of this sponge is the peculiar structure, which is much like that of the calcareous genus *Leucosolenia* Bowerbank. The entire sponge consists of a mass of frequently anastomosing tubes, each a little over 1 mm in diameter, the walls being compounded out of more or less reticulate fibers, each 100  $\mu$  in diameter, and rendering the walls about this same thickness. So many of these tubes come up to an end at the surface that it is rendered papillate; at the surface these structures are usually about 400  $\mu$  in diameter. The meshes enclosed between the tubes vary greatly in size, but average approximately 1 mm in greatest diameter and are rather rounded in outline. The spicules are oxeas 9  $\mu$  by 140  $\mu$ , and not only densely crowd the fibrous tracts, but are packed in the soft parts around the fibers, perpendicular to them, leaving little room for any flesh whatever. There are, however, cavities here and there, which are presumably flagellate chambers. They are 20  $\mu$  by 35  $\mu$  to 45  $\mu$  by 65  $\mu$  in dimensions. The microscleres are sigmas of some variation in size, but averaging about 40  $\mu$  chord.

This is a strongly marked species; there is no other *Gelliodes* even remotely resembling it; in fact, the habitus is so peculiar that one is



tempted to erect for it a new genus, but the spiculation and the minute architecture are so nearly like *Gelliodes* that we may use that generic name for the present.

Family HALICLONIDAE de Laubenfels

HALICLONA Grant

HALICLONA PELLASARCA, n. sp.

*Holotype*.—U.S.N.M. no. 22336; from station 45, latitude  $18^{\circ}13'10''$  N., longitude  $67^{\circ}25'30''$  W. to latitude  $18^{\circ}14'30''$  N., longitude  $67^{\circ}25'30''$  W., February 13, 1933, 20 to 40 fathoms.

The specimen as preserved is a lamellate structure with some faint indications that it may have been a crust that was pried loose from a substratum to which it had not made firm attachment. The size is 1 by 5 by 8 cm. The color is dark drab to walnut brown, and the consistency is softly spongy, easily cut. The surface is even, and the pores and oscules dubiously made out; there are minute openings, a few of which reach the diameter of  $500\ \mu$ . The internal structure is fleshy, the dense protoplasmic ground mass containing an isodictyal reticulation of spicules after the type sometimes called "renierid". Here and there are vague tracts of ascending fibers; they consist of scarcely more than three spicule rows and are about  $15\ \mu$  in total diameter. The spicules are oxeas only, the size about  $5\ \mu$  by  $165\ \mu$  to  $8\ \mu$  by  $240\ \mu$ .

This species is remarkable for the enormous quantities of dark protoplasmic structure present, resembling in this respect a species that may possibly be closely related. It was described as *Amphimédon variabilis* by Duchassaing de Fonbressin and Michelotti (1864, p. 80) and was preserved dry, which renders precise comparison difficult. Its spicules were much smaller than those of *pellasarca*, being only  $2\ \mu$  by about  $100\ \mu$ , and even so they are not certainly proper. Duchassaing and Michelotti's specimen possibly may even be a keratose sponge. On the other hand, it and *H. pellasarca* may be two variant forms of one species. Since this is merely surmise without sound basis of evidence, I describe the specimen as a new species.

HALICLONA PODATYPA, n. sp.

*Holotype*.—U.S.N.M. no. 22305.

This and a similar specimen were collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

The two specimens are each about 4 by 5 by 15 cm in size. The color is pale drab, and the consistency is spongy but with a much stiffer ectosome than the endosome. The cortex is a much denser structure than the internal portion, but it scarcely can be described as a special dermal skeleton, as it is merely a confused mass of fibers and spicules not spaced so widely as is the case below. The pores are not conspicuous, but the oscules are remarkable; they are located about 5 mm apart over almost the entire surface of the sponge, and average about 2 mm in total diameter. Unlike the oscules of most sponges they are not round in outline, but exceedingly irregular. Some are Y shaped, others heart-shaped, but the commonest form resembles that of a human footprint. The endosomal structure consists of a subrectangular reticulation of spongin fibers containing numerous rows of spicules. The total diameter is about  $50\ \mu$  to  $150\ \mu$ . Among these fibers occur a good many interstitial spicules, somewhat smaller than those in the fibers. These occasionally make a vague isodictyal reticulation themselves. The spicules are only oxeas varying from about  $4\ \mu$  by  $119\ \mu$ , in the fibers, to  $2\ \mu$  by  $90\ \mu$  only in the interstitial structures.

The fibrous structure of this species is by no means common, but the most striking thing of all, as mentioned above, is the strange shape of the oscules.

### Family SPONGIIDAE Gray

#### HIRCINIA Nardo

#### HIRCINIA RAMOSA, n. sp.

*Holotype*.—U.S.N.M. no. 22317.

*Other specimens*.—U.S.N.M. nos. 22258, 22278, and 22397.

The type is from station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms. The others were collected at station 10, latitude  $18^{\circ}29'20''$  N., longitude  $66^{\circ}05'30''$  W., to latitude  $18^{\circ}30'24''$  N., longitude  $66^{\circ}04'15''$  W., 120 to 160 fathoms; station 17, latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}10'30''$  W. to latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}12'20''$  W., 46 to 90 fathoms; and station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., 80 to 120 fathoms. All are cylindrical and ramose. The type is 1 cm in diameter, having about half a dozen branches, attaining a total maximum height of some 20 cm. The others vary from 7 to 15 mm in diameter, and are all somewhat shorter. The color is drab, and the consistency is very spongy. The surface is sharply conulose with conules about 1 to 2 mm high and 2 to 3 mm apart. The

pores and oscules are notably difficult to make out for this genus, in which the pores, at least, are usually conspicuous, and the oscules also frequently striking. The endosome is precisely that typical of the genus. The fascicular, main, or ascending tracts are made of spongin and cored with some detritus; their individual fibers are about  $170\ \mu$  in diameter. The rounded intrafascicular meshes are about  $100\ \mu$  by  $200\ \mu$ . The total diameter of the fascicular tracts is about  $800\ \mu$ . The meshes between them are 1 to 3 mm in diameter. The flesh is moderately crowded with filaments as typical of the genus *Hircinia*, diameter about  $3\ \mu$ , the tylole heads are nearly spherical,  $10\ \mu$  in diameter.

Schmidt (1862, p. 34) described a Mediterranean species as *Filifera variabilis*. His description is almost unrecognizable, but his reference to violet color is notable. Schultze (1879, p. 12) described a species as *Hircinia variabilis*, which is presumably the same as that of Schmidt, but the color is not violet. Throughout the West Indian region there occurs commonly a species that answers in general to the description of *variabilis* Schultze, though it is exceedingly doubtful whether this is *variabilis* of Schmidt, in which case a new name will need to be established for the later species. For this purpose the name *variata* may be employed. From this species *ramosa* may be separated, first in the extreme ramose form characteristic of the latter, *variata* being usually almost massive, although sometimes prolonged into cylindrical projections. A much more important distinction is that *ramosa* is lipostomous, whereas *variata* typically possesses conspicuous and rather numerous oscules.

#### POLYFIBROSPONGIA Bowerbank

##### POLYFIBROSPONGIA ECHINA, n. sp.

*Holotype*.—U.S.N.M. no. 22315; from station 26, latitude  $18^{\circ}30'20''$  N., long.  $66^{\circ}22'05''$  W., to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

This specimen comprises a basal mass about 5 by 7 cm, from which arise processes 1.5 cm in diameter and 2 to 4 cm high. The surface is black exteriorly over a gray interior. The consistency is very spongy. The surface is thrown into tubercules or conules about 2 mm high and 4 mm apart, the apices of each of which may again be divided into 2 to 5 minute processes or protruding fiber ends. The pores could not be made out, and only one obvious oscule can be found; it is terminal, 2 mm in diameter. The endosome is densely reticulate, with small fibers of clear spongin, not at all cored, which make polygonal meshes much like those of the genus *Hippospongia*

Schulze. The mesh is often about  $400\ \mu$  in diameter but varies from  $100\ \mu$  to  $700\ \mu$ . As in the genus *Spongia*, here and there throughout the reticulation are special ascending fibers much larger than the others, ranging from about  $50\ \mu$  to  $100\ \mu$ . These have about the central third cored profusely with minute fragments of detritus. They are not found uniformly spaced throughout the mesh, but instead 2 to 4 of them are found close together, united by numerous secondary connectives about  $20\ \mu$  in diameter and resembling the common type of fibers throughout the sponge. These connectives may be compared to the rungs of a ladder, but the openings between them are less often rectangular than somewhat oval in outline. This whole formation of grouped ascending fibers with connectives may be referred to as fasciculated principal fibers. In both the principal and secondary fibers the longer axes of the meshes are frequently directed toward the surface of the sponge, making a distinctive pattern, though one by no means peculiar to this species.

Discussion of the relationships of *echina* is difficult at this time, because the majority of the sponges that should be allocated to the genus *Polyfibrospongia* at present are scattered among various other genera. I am elsewhere undertaking a revision of this and related species and therefore postpone further discussion.

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